**Before the**
**FEDERAL COMMUNICATIONS COMMISSION**
**Washington, D.C. 20554**

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| In the Matter of | ) | |
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| Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services | ) | WT Docket No. 03-264 |

To: The Commission

# COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®


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December 19, 2005

## SUMMARY

In response to the *Further Notice*, CTIA urges the Commission to adopt its proposal to supplement the current Equivalent Isotropically Radiated Power ("EIRP") rules applicable to Part 24 Broadband PCS and Part 27 AWS with a power spectral density limit. As the President, Congress, and the FCC have recognized, facilitating wireless, as well as wireline, broadband deployment in both rural and non-rural areas is an important and worthwhile public policy goal. In furtherance of this goal, the technical rule changes that CTIA has proposed and that are the subject of the *Further Notice* will change the economics of mobile wireless broadband deployment in rural areas by enabling providers using certain wideband technologies to install fewer base stations over larger geographic areas. Our proposed changes would also permit carriers to provide higher-speed data services than would otherwise be possible.

As currently worded, the EIRP rules result in more stringent limits on wideband technologies than the aggregate radiated power produced by narrowband systems operating in the same amount of bandwidth. The proposal rationalizes radiated power limits so they are technology neutral. It does not loosen them or increase the risk of interference. In effect, adoption of the CTIA proposal will make the transition to wideband systems easier and will enhance the deployment of high-speed wireless data services – particularly in rural areas where there are widely spaced coverage cells. For example, many GSM/TDMA providers are or soon will be evolving their networks to WCDMA. Currently, these providers' base station locations are configured to extend service over a given coverage area relying on the Commission's power limits as applied to narrowband emissions. With a wider band offering such as WCDMA, the current rules will restrict the permissible power level – reducing the coverage area under the current base station configuration or forcing providers to acquire and deploy new cell sites in order to match existing coverage.

In particular, the Commission should supplement the current rules with a power spectrum density limit expressed as Watts per MHz, which involves a simple calculation – the product of the Watts per MHz emission limit and the emission bandwidth in MHz. Broadband PCS and AWS licensees are sophisticated entities that can easily gauge the permissible limits, and a Watts per MHz approach will foster innovation by avoiding the command-and-control, arbitrary line drawing associated with a "stepped approach." Further, the Commission should revise the rules to eliminate the reference to "peak" radiated power limits, which will ensure that the rules are in step with developments in technology and industry practice. Finally, adoption of the proposal would not increase the total allowed radiated power in a given bandwidth from a specific transmitter site, and there would not by any new significant administrative burdens regarding environmental compliance.

With these simple technical changes, the Commission will level the playing field among narrowband and wideband technologies – and will significantly enhance opportunities to deploy broadband wireless systems in rural areas.

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## COMMENTS OF CTIA – THE WIRELESS ASSOCIATION®

CTIA – The Wireless Association® ("CTIA")[1] hereby submits the following comments in response to the *Further Notice of Proposed Rulemaking* released in the above-captioned proceeding.[2] The *Further Notice* responds to CTIA's proposal to modify the base station Equivalent Isotropically Radiated Power ("EIRP") rules applicable to Part 24 Broadband PCS and Part 27 AWS to make them technology neutral and to enhance opportunities to deploy wireless broadband systems in rural areas. CTIA looks forward to working with the Commission "to craft a clear and workable radiated power rule that is not unduly burdensome."[3]

[1] CTIA – The Wireless Association® (formally known as the Cellular Telecommunications & Internet Association) is the international organization of the wireless communications industry for both wireless carriers and manufacturers. Membership in the organization covers Commercial Mobile Radio Service ("CMRS") providers and manufacturers, including cellular, broadband PCS, and ESMR, as well as providers and manufacturers of wireless data services and products.

[2] *See Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, Report and Order and Further Notice of Proposed Rulemaking, FCC 05-144 (rel. Aug. 9, 2005) ("*Further Notice*").

[3] *Id.* at ¶ 49.

## INTRODUCTION

In the *Further Notice*, the Commission states, "[o]ur radiated power rules are intended to limit the interference potential of wireless systems while still providing technical flexibility to licensees."[4] Unfortunately, the current radiated power limits in the Broadband PCS and AWS rules impose unnecessary constraints on next generation wireless technologies. In particular, because the rules impose radiated power limits on each individual "emission"[5] – without distinction between narrowband and wideband emissions – wider band technologies such as WCDMA are subject to more restrictive radiated power constraints than narrowband emissions' aggregate radiated power within the same bandwidth. In effect, the current rules artificially constrain more modern technologies—technologies that increase network efficiency and decrease the cost of deploying new services by expanding coverage over larger areas and improving coverage outdoors, indoors, and in vehicles.

As part of the Biennial Review proceeding, CTIA proposed that the Commission supplement the current EIRP limits with a power spectral density limit that would level the playing field and eliminate the artificial constraints imposed on wideband technologies.[6] As the *Further Notice* acknowledges, CTIA's proposal represents a compromise among industry participants, and it serves as the basis for the questions posed therein. CTIA urges the Commission to adopt these technical modifications that will change the economics of mobile

[4] *Id.* at ¶ 53.

[5] The *Further Notice* expresses a preference for the term "emission" rather than the common industry term "carrier" to describe "one radiated RF wave, whether modulated or unmodulated." *Id.* at ¶ 51 n.169. Accordingly, CTIA uses the term emission throughout these comments.

[6] *See* Letter from Paul Garnett, CTIA, to Marlene H. Dortch, Secretary, FCC, WT Docket No. 03-264 (filed Oct. 20, 2004); Letter from Paul Garnett, CTIA to Marlene H. Dortch, Secretary, FCC, WT Docket No. 03-264 (filed Feb. 7, 2005).

wireless broadband in rural areas by enabling providers using certain wideband technologies to install fewer base stations over larger geographic areas.

## I. THE CURRENT EIRP RULES RESULT IN MORE STRINGENT LIMITS ON WIDEBAND TECHNOLOGIES, WHEREAS THE ADDITION OF A POWER SPECTRAL DENSITY LIMIT WOULD REMOVE AN ARTIFICIAL CONSTRAINT THAT INHIBITS WIRELESS BROADBAND DEPLOYMENT

The Commission has acknowledged the disparities caused by the current EIRP rules on several occasions. In the 2002 Biennial Review *Notice of Proposed Rulemaking*, for example, the Commission recognized that the current Broadband PCS rule allows "licensees utilizing relatively narrower bandwidth technologies (*e.g.*, GSM) to operate with higher aggregate power across their authorized spectrum than licensees utilizing relative[ly] broader bandwidth technologies such as CDMA."[7] In the *Further Notice*, the Commission explained the tension as follows:

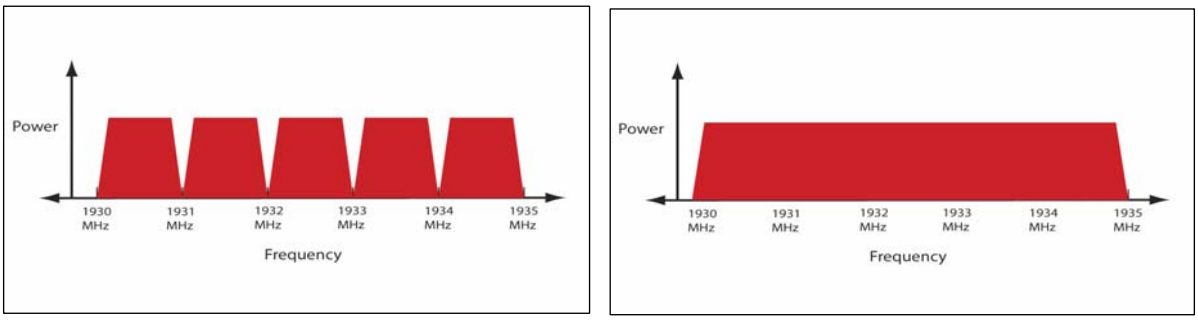
> Existing narrow emission PCS technologies (*i.e.* TDMA, GSM) carry 3 to 8 voice conversations per emission, while existing wide emission technologies (*i.e.* CDMA) carry as many as 20 to 40 voice conversations per emission. Because the current rule makes no distinction between wide and narrow emissions, it applies the same maximum radiated power limit to both. Consequently, a wide emission system is allowed to provide only about one fifth of the radiated power for each voice conversation that a narrow emission system is allowed to provide, assuming that each system is fully loaded and operating at the maximum power permitted by rule. Thus the average voice conversation on the wide emission system would have a lower signal to noise ratio, which … would reduce the coverage range.[8]

[7] *Biennial Regulatory Review – Amendment of Parts 1, 22, 24, 27, and 90 to Streamline and Harmonize Various Rules Affecting Wireless Radio Services*, Notice of Proposed Rulemaking, 19 FCC Rcd 708, 716 (2004).

[8] *Further Notice* at ¶ 58 (citations omitted).

In practice, wideband technologies are subject to a several dB penalty, which limits base station coverage areas and substantially reduces the peak data rate of future HSDPA systems. The current limits prevent wireless carriers from taking advantage of technologies that will increase network efficiency and significantly decrease the cost of deploying services to the benefit of consumers. Moreover, researchers and inventors looking ahead are forced to give up power in order to use wider bandwidths.

The following illustration contrasts permitted and prohibited configurations under the current EIRP limits in the Broadband PCS band. One can easily see that there should be little or no difference in the interference created by the two configurations. They have essentially identical patterns of spectrum occupancy. The essence of CTIA's proposal is that the prohibited configuration should be permitted.




Permitted Prohibited

**Figure 1. Permitted and Prohibited Configurations**

As a result, CTIA proposes that EIRP be limited to the larger of either the current rules or a power spectral density constraint that facilitates deployment of new technologies. In particular, base stations having an antenna height of up to 300 meters HAAT should be limited to the larger of (1) 1640 watts average EIRP per emission, or (2) 3280 watts per MHz of emission bandwidth. For rural areas, the EIRP limits would be increased to 3280 watts average EIRP per emission and

6560 watts per MHz of emission bandwidth. For stations using an antenna height greater than 300 meters above average terrain, the "Watts per MHz" limit should be set to 1640 rather than 3280 watts. CTIA seeks these changes in Part 24 Broadband PCS rules, 47 C.F.R. § 24.232, and Part 27 AWS rules, 47 C.F.R. § 27.50. We do not propose such changes for non-AWS services in Part 27 such as BRS/EBS, which has a different EIRP limit, unique coordination issues, and is undergoing a significant transition, or for Part 22 cellular service, which is subject to a different limit than the 1640 watts EIRP limit in Broadband PCS and AWS.

It is in rural areas where the impact is most readily apparent. Adoption of the CTIA proposal would make the transition to wideband systems easier and would enhance the deployment of high-speed data services. In particular, the proposal would enhance the transition to wideband systems in areas of widely spaced coverage cells. For example, many GSM/TDMA providers are or soon will be evolving their networks to WCDMA. Currently, these providers' base station locations are configured to extend service over a given coverage area relying on the Commission's power limits as applied to narrowband emissions. With a wider band offering such as WCDMA, the current rules will restrict the permissible power level – reducing the coverage area under the current base station configuration or forcing providers to obtain new cell sites in order to match existing coverage. Rural areas and highway coverage would be particularly affected under such circumstances.

As the Commission stated in the *Further Notice*, "ideally it is in the public interest for competing telecommunications technologies to succeed or fail in the marketplace on the basis of their merits and other market factors, and not primarily because of government regulation."[9] In this case, the Commission should eliminate the inequitable application of the EIRP rule to avoid

[9] *Id*. at ¶ 56.

the unenviable result of either more limited wireless broadband deployment or more costly, lengthier deployments due to further cell site deployments.

## II. THE CTIA PROPOSAL IS TECHNOLOGY-NEUTRAL, CLEAR, AND OBJECTIVE

### A. The Proposal Rationalizes Radiated Power Limits – It Does Not Loosen Them or Increase the Risk of Interference

The *Further Notice* seeks comment on the potential impact of "increases in our radiated power limits" and ways to minimize interference.[10] CTIA's proposal does not increase permissible radiated power levels but rather evens the playing field between narrowband and wideband emissions.

The proposal is consistent with – and even slightly below – the power spectral densities permitted under the current EIRP rules that limit radiated power to 1640 watts per emission. PCS licensees today, for example, can and do operate GSM systems with two emissions in a 1 MHz bandwidth, which collectively can generate a signal with 3280 watts EIRP per MHz. A GSM system with three emissions in 1 MHz, a possible configuration, can generate 4920 watts EIRP per MHz. Thus, CTIA's proposal is right in line – or even below – the current radiated power limit as expressed as a power spectral density level.

Further, the proposal does not lack an upper limit or cap on radiated power as the *Further Notice* seems to suggest, and it does not result in additional risk of interference.[11] The limit on radiated power is the product of the per MHz emission limit and the emission bandwidth in MHz – it is, in effect, capped by the emission bandwidth. The *Further Notice* observes that a

[10] *Id.* at ¶¶ 65, 66.
[11] *Id.* at ¶ 60.

WCDMA emission in a 5 MHz bandwidth could result in 32,800 watts in rural areas,[12] which is the same amount of radiated power that a GSM system operating with two emissions per MHz could generate over the same 5 MHz band in rural areas and is substantially less than an AMPS system (with more than four emissions per MHz) could generate. As such, any interference created by a wideband emission operating at the proposed limits would be not be more than the interference created by legacy technology operating at the current limits.

Notably, CTIA's proposal is a compromise of positions submitted previously by CTIA member companies,[13] and it has the support of PCS licensees who operate the very co-channel and adjacent channel systems that would be subject to interference if operation under the proposed rules created the potential for increased interference. Their support reflects that these modifications for wideband emissions result in permitted radiated power levels equivalent to those currently allowed for narrowband emissions and thus do not constitute any increased risk of interference to ongoing – or future – operations. For the same reasons, the Commission need not initiate a new technical information sharing framework among licensees, as the current information sharing mechanisms that operate between licensees will continue to work effectively under a revised EIRP rule.

[12] *Id.*

[13] *See, e.g.*, Comments of Motorola, Inc., WT Docket No. 03-264 (filed Apr. 23, 2004); Comments of Qualcomm Incorporated, WT Docket No. 03-264 (filed Apr. 23, 2004); Comments of Ericsson Inc., WT Docket No. 03-264 (filed Apr. 23, 2004); Comments of Cingular Wireless LLC, WT Docket No. 03-264 (filed Apr. 23, 2004); Letter from Ray Strassburger, Nortel Networks, to Marlene H. Dortch, FCC, WT Docket No. 03-202 (filed March 5, 2004).

### B. A Power Spectrum Density Rule (expressed as Watts per MHz) with a Savings Clause Provision for Narrowband Emissions is the Most Straightforward and Most Appropriate Approach to Radiated Power Limits

The "Watts per MHz" approach is easily understood and would not result in the "complexity" suggested in the *Further Notice*.[14] As noted above, it involves a simple calculation – the product of the Watts per MHz emission limit and the emission bandwidth in MHz. It is straightforward and technology-neutral, and it avoids the arbitrary line drawing of a "stepped approach" that could hamper future technologies. The *Further Notice* acknowledges the unfortunate circumstance that "[s]ometimes … an FCC rule adopted under earlier unknown or different technological circumstances will inadvertently affect new and evolving technologies unequally …"[15] In this case, the Commission can avoid such subjective action and, with a Watts per MHz approach, it can still ensure that the fundamental purpose of the rule – interference protection – is maintained. Enforcement, moreover, would be objective as well.

A stepped approach in contrast would create a command-and-control, top down radiated power limit that could handicap some technologies and result in less efficient networks. The *Further Notice* attempts to analogize to a highway safety policy that would require heavier vehicles to travel slower than lighter vehicles, either through two posted speed limits or a "mph per ton of vehicle" ratio.[16] The analogy is inapposite. The highway safety policy governs consumer decisions, whereas the radiated power limit sets restrictions that equipment manufacturers and spectrum licensees – sophisticated entities engaged in the technology world – must follow. Whereas drivers on a highway may not know the relevant variable (vehicle weight)

[14] *See Further Notice* at ¶ 62.
[15] *Id.* at ¶ 56.
[16] *Id.* at ¶ 62.

governing speed, it is highly unlikely that a wireless service provider would be unaware of the emissions bandwidth operating on its own system. The stepped approach fails to deliver the simple, forward-looking limit that is warranted here.

In addition, the Commission seeks comment on whether to apply a power spectral density limit to narrowband emissions as well as wideband emissions, because some commenters previously expressed concern that the power allowed by such a rule for narrowband emissions would be lower than the permitted level under the current rule.[17] The *Further Notice* thus asks questions regarding where to draw the line between narrowband and wideband emissions. CTIA's proposal offers a simpler solution that would ensure that a revised approach would not disrupt operations involving existing narrowband technologies: allow operations consistent with the larger of the existing rule or a comparable power spectral density. Thus narrowband emissions such as AMPS or GSM would be treated as they are today without concern that a Watts per MHz limit could lower existing permitted radiated power limits.

### C. An Average Radiated Power Limit Eliminates Uncertainty and More Accurately Reflects the Technologies and Practices of Today

CTIA agrees with the Commission that the question of *peak* versus *average* radiated power limits is logically separate from a decision to supplement the current EIRP rule with a power spectral density limit. Nonetheless, the Commission should eliminate the current rules' reference to "peak" radiated power limits. CTIA has previously reported, as the *Further Notice* recognizes, that the "peak" radiated power limits produce uncertainty.[18] This modification would not lead to a change from the current practice for measuring base station EIRP levels but instead would revise the rules to keep them in step with developments in technology and industry

[17] *Id.* at ¶ 59.
[18] *Id.* at ¶ 70.

practice. The Commission should simply eliminate the reference to "peak" or replace it with "average."

Using peak measurements for non-constant envelope technologies like CDMA and WCDMA does not provide an accurate picture of the power in the band. In fact, such a measurement only captures and represents the power peaks with duration of sub-micro seconds that occur with a low probability in the band and thus artificially assigns a much higher power in the band than levels observed during operation.

As an alternative, the *Further Notice* seeks comment on the use of a peak-to-average ratio ("PAR") limit in addition to an average radiated power limit.[19] A PAR limit would be confusing, would tend to restrict wideband technologies, and would not serve any sound regulatory purpose. As an initial matter, market forces already operate to minimize PAR, as there is a direct correlation between higher PAR and the cost of equipment and deployment. Nonetheless, non-constant envelope technologies with a PAR greater than zero already exist and they coexist with nearby operations. Given these marketplace realities, it is not necessary to adopt a PAR limit in order to guard against interference. In addition, modern multicarrier systems, such as OFDM and CDMA, transmit many low power signals in a single waveform. The PAR concern is an artifact of how the combined power of these multiple waveforms is measured.

In contrast, a rule that constrains the average power of such emissions, where the average power is measured over active time slot(s), will both control interference and permit the efficient adoption of new technologies. The FCC should revise the rule to clarify that an average method of measurement may be used.

[19] *Id.*

### D. The Proposal Has No Material Affect on the Administrative Burdens Associated with Environmental Compliance

Finally, the Commission seeks comment on whether modification of the EIRP limits "will impact [a] licensee's administrative burden in making filings required for proper evaluation of transmission sites in regard to environmental compliance."[20] While a power spectral density rule could affect the equation necessary to make a proper evaluation, CTIA again observes that its proposal does not increase total allowed radiated power in a given bandwidth from a specific transmitter site. CTIA does not believe there would be any significant increase in administrative burden in terms of the number of facilities requiring full environmental evaluation instead of being categorically excluded.

[20] *Id.* at ¶ 67.

## CONCLUSION

For the reasons set forth above, CTIA urges the Commission to supplement the current Part 24 Broadband PCS and Part 27 AWS EIRP rules to ensure they are technology-neutral and appropriate for today's technologies, consistent with CTIA's proposal. These technical rule modifications will change the economics of mobile wireless broadband deployment in rural areas by enabling providers using certain wideband technologies to install fewer base stations over larger geographic areas.

Respectfully submitted,

/s/ Paul W. Garnett

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